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JEL Classification: F14, F15, N73, N14

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The ripples of the Industrial revolution: exports, economic growth and regional integration in Italy in the early 19th century[1]

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Abstract

The conventional wisdom about the early stages of modern economic growth in Italy is still heavily influenced by the work of L.Cafagna (1989). He argued that exports of primary products to industrializing North Western countries were the main source of growth and that exports of silk stimulated the industrialization of the North-West (the "industrial triangle"). However, the benefits did not extend to the rest of the country. In this paper we argue that this view is not supported by the trade data. Italian exports grew slowly relative to European and world trade and exports from the North grew less than the total. This view tallies well with some recent estimates of GDP per capita, which show no increase before the Unification (1861).

1.- Introduction

On March 17th 1861, the Italian Parliament gathered for the first time in Turin and proclaimed the King of Sardinia, Vittorio Emanuele II, King of Italy. The ceremony marked the official end of a political division which dated back to the end of the Roman Empire. Since the Congress of Vienna Italy had been divided in five major polities, the Kingdom of Sardinia (which, in spite of the name, actually consisted mainly of Piedmont and Liguria), the Papal States, the Grand-Duchy of Tuscany, the Kingdom of Two Sicilies (i.e. the Continental South and Sicily proper, which remained divided by a trade barrier) and Lombardo-Veneto (Lombardy and Venetia), formally an independent kingdom belonging to the Austrian emperor, and three minor ones, the Duchies of Parma-Piacenza, of Modena-Reggio and of Lucca, which had been annexed to Tuscany in 1847.

The Unification was undoubtedly an epoch-making event for Italian and European politics, but was it similarly important for the Italian economy? How did it affect modern economic growth (or lack of it)? These questions were central in the literature of the 1950s and 1960s (Federico 2001) but since then they have largely neglected by economic historians (Cohen-Federico 2001). The standard reference works devote at most few pages to the decades before the Unification (Toniolo 1990, Zamagni 1993, Battilossi 1998, Ciocca 2007). There are few exceptions to this relative neglect, and the most important is a new series of GDP per capita of the Centre-North from 1310 to 1913 (Malanima 2010), which we reproduce in Figure 1 (left-hand scale, 1911 constant lire).

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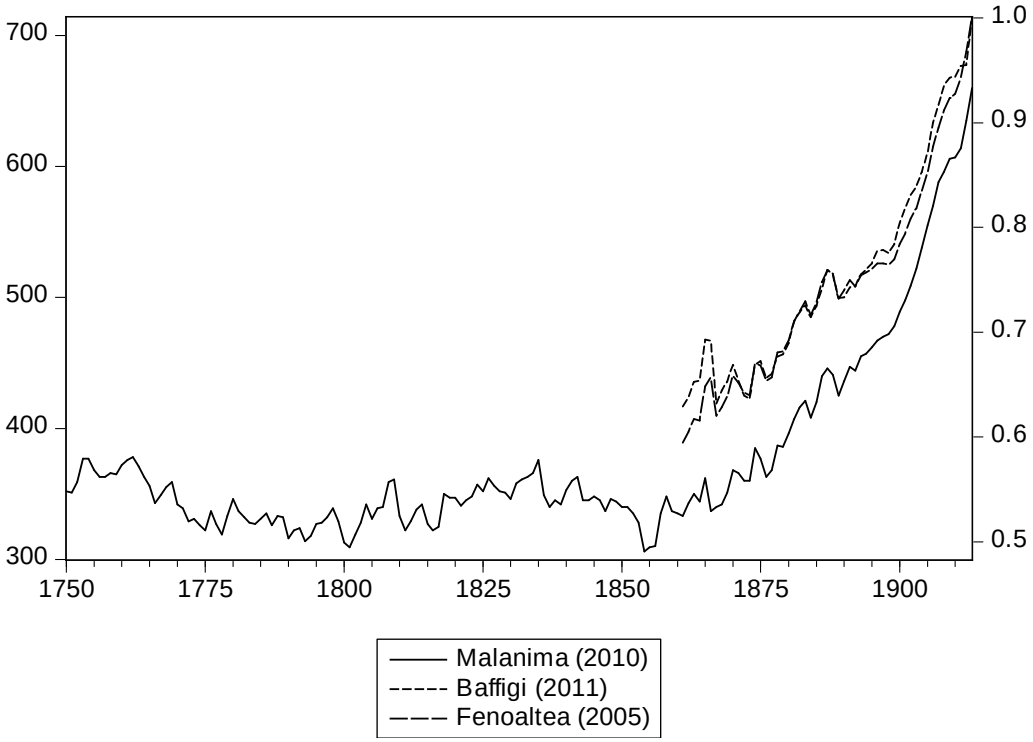
Figure 1
Italian GDP per capita



The Italian economy did not make any significant progress from Waterloo to the Unification The modest gains to the mid-1830s were lost in the 1840s and early 1850s and the GDP per capita started to rise only after the Unification. The recent estimates of GDP after 1861 by Fenoaltea (2005) and Baffigi (2011), which underpins the massive *Oxford Handbook of the Italian economic history since Unification* (Toniolo 2013), confirm the growth, although they downplay somewhat its rate (Figure 1, right hand scale, index 1913=1).[1] On the other hand, a sceptical reader may find two arguments to question the existence of a discontinuity. First, Malanima's series refers to the Centre-North before 1861 and to the whole country thereafter. Second, he assumes constant relative productivity between agriculture and the rest of the economy until 1861.[2] In theory, the nation-wide GDP per capita would

[1] A Quandt-Andrews test singles out 1867 as the most likely date for discontinuity, but we prefer to use 1861 as dividing point for its political meaning. Whenever possible, we estimate yearly rates of change b=- β/ψ with coefficients from a regression $\Delta \text{ Ln } M_t=\alpha+\beta \text{ TIME}+\psi \text{ ln}M_{t-1}+ \varphi \text{ ln } \Delta \text{ Ln } M_{t-1} +u$ (Razzaque et al 2007). The estimated yearly rates of change with the Malanima series are -0.076 for 1713-1861 and 1.45 for 1861-1913 (both significantly different from zero and between themselves). The rates for Fenoaltea (2005) and Baffigi (2011) series are almost identical – 1.00% and 1.02% .

[2] The estimates for the agricultural sector are conceptually similar before and after 1861. Both Malanima (2010) and Federico (2003), which all authors rely on for the period after the Unification, use a demand-side method, although the latter double-checks results with a production-side estimate. There is no ground to argue that the same method would work after, but not before, 1861. All authors estimate the value added in industry and services after 1861 as sum of series by branch, from different sources. These series are not available before 1861 and thus Malanima assumes that labour productivity in industry and services remained 25% higher than productivity in agriculture throughout the whole period. His series would thus undervalue the growth in non-agricultural Value Added if relative productivity had been rising before 1861. Such a case cannot be ruled out,

have grown at 1% before 1861 (i.e. as much as after 1861), if the Value Added per capita in the South or in non-agricultural productions had been growing fast enough – respectively around 4% and around 3%. [3] These rates seem implausibly high, and the hypothesis is not supported by any evidence.

A scholar not familiar with the Italian literature might interpret the coincidence in timing as causation. He would look for some radical changes in economic policy after the Unification which can explain the start of modern economic growth and he would find ample evidence to this. Indeed, the new Kingdom abolished all barriers to domestic trade, liberalized foreign trade by adopting the free-trade Sardinian tariff in 1861 and cutting further duties in a treaty with France three years later and started a massive program of investment in public works, most notably long-range railways lines. These measures aimed explicitly at fostering the development of a national market and at improving the allocation of resources via domestic and international specialization. Until the late 1950s, the consensus view was that these policies had been effective, and this view tallied well with an early interpretation of fight for the Unification (the Risorgimento) as largely inspired by economic motivations (Candeloro 1958 pp.334-348). The seminal works by Ciasca (1916) and Greenfield (1934) stressed how much the patrioti (the people who fought for a unified Italy) were aware of the benefits of free-trade and market integration. Cavour, the engineer of the Unification, himself had written a pamphlet on railways (Cavour 1846) and remained for all his life an ardent supporter of free trade (Romeo 1977-1984). This interpretation was not supported by any quantitative evidence on the alleged beneficial effects of the Unification. Only very recently Ciccarelli and Fenoaltea (2013) have tentatively related the good economic performance of some Southern provinces in the 1870s to the policies of the unified Italy.

Nowadays, nobody seems to believe that the Risorgimento was motivated by the expectations of economic benefits. It is is considered a purely political and ideological movement (Riall 1994 Banti 2000 and 2004) and the gains of the Unification are deemed very small or negligible. The change in the opinion about the economic effects of the Unification owes a lot to the publication in the 1960s of a number of papers by L. Cafagna, later collected in his book *Dualismo e sviluppo nella storia d'Italia* (Cafagna 1989). [4] He argued that the Unification changed very little because the political division had

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but it cannot be sufficient to achieve a very high rate of growth of Value Added as a simple back-of-the-envelope computation can show. Let's assume that by 1815 productivity in industry and services were equal to productivity in agriculture rather than 25% higher as hypothesized by Malanima and that all the gap was cumulated in the next 35 years. Such a rise in relative productivity corresponds to a 0.5% yearly additional rate of growth in Value Added.

[3] In 1861, industry and services accounted for about half (Baffigi 2011) and the Kingdom of the Two Sicilies for about 40% (Brunetti et al 2011) of Italian GDP.

[4] Cafagna has sketched out his theoretical framework, a list of the great and the good of development economics of the 1960s, in Cafagna (1994). Some of the ideas have been elaborated and refined by Bonelli (1979) – so that this narrative is often associated to both authors. See for further details Cohen-Federico (2001) and the critical review by Fenoaltea (2011).

not been a major hindrance to development before 1861. There was no potential for a fruitful division of labour among Italian states as they were all similarly poor and backward. They had to specialize in production of primary commodity for the industrializing countries of Northern Europe. Some areas of Northern Italy (the so called "industrial triangle" – Piedmont, Lombardy and Liguria) were more successful than the rest of the country in exploiting this opportunity and their early growth opened a gap with the rest of the peninsula ("dualism"). It seems fair to say that, in spite of some dissenting voices, Cafagna's ideas are still part and parcel of the conventional wisdom about 19th century Italian economic growth. However, this conventional wisdom is based on quite thin empirical evidence. Cafagna never tried to prove his hypotheses, and his reluctance is understandable: the task would have been impossible with the data and the technical means of the 1960s. Fifty years later, as a short review of the literature in the next Section shows, our knowledge has made huge strides, but many pieces of the jigsaw are still missing. Arguably, the biggest of all is the role of interactions with world markets for goods and capital. This paper aims at filling this gap. In Section Three we compare total "Italian" exports from the 1820s to the Unification with trends in world trade and in Section Four we consider separately the performance of the seven states. [5] Section Five deals with capital imports which Fenoaltea (1988) claims to have played an essential role in the Italian growth after the Unification. Section Six focuses on commerce within Italy trade, and Section Seven concludes.

2.- What do we know and what should we know about economic growth in Italy

Cafagna's narrative starts from a hardly controversial fact: early 19th century Italy was a poor and backward country. Agriculture employed most of the population and most of manufacturing still used traditional, quasi-artisanal techniques. The few modern factories shielded from foreign competition behind high duties. Thus, Italy, as other peripheral countries, was bound to stagnate, and growth and accumulation of capital could come only from exports. In his Keynesian model, the ebb and flow in demand from industrializing countries of Northern Europe caused parallel fluctuations in the Italian economy. Italy as a whole exported a wide range of products, but by far the most important exportable was silk, which was produced mostly in Northern Italy. Silk was a real blessing, because, unlike most primary products (Williamson 2011), it fostered industrialization. To understand Cafagna's reasoning, it is necessary a short technical description of silk production (Federico 1997). Silk is a thread is secreted by an insect, the silkworm, to protect itself into a cocoon while transforming into a moth. Silkworms are fed on mulberry leaves and raising silkworms is a very labour-intensive activity, suitable for water-rich and densely populated areas, such as the North-Italy. Cocoons have to be spun (reeled) to extract the thread and the yarn, or raw silk, has to be strengthened before being woven (throwing). Throwing had been mechanized since the Middle Ages, while reeling had remained a

[5] See for all details on sources and methods of estimation Appendix A.

part-time job for farmers. The great novelty was the development, at the beginning of the 19th century, of steam-powered reeling machinery, which produced a better silk at a lower cost. Steam reeling mills were for Italy, and later for China and Japan, what cotton mills had been for Lancashire during the Industrial revolution. They trained industrial manpower, stimulated the development of financial institutions to provide credit and created a demand for the production and maintenance of highly specialized machinery. The income from silk increased the consumption of manufactures and the accumulation of capital, which was then invested in other industrial activities.

Most Italian silk was produced in the subalpine region of Northern Italy, and, jointly with the abundance of water, an essential source of power in a country without coal (Bardini 1997), the development of the silk industry explained the early industrialization of the "industrial triangle". Unfortunately, the growth in the North did not create much demand for Southern products. The South did not produce cotton or other raw materials for Northern industries, while olive oil and citrus fruits were still luxury goods for Northern consumers. On the other hand, Southern demand for manufactures was small and Northern firms had to compete before Unification with heavily protected domestic producers and afterwards with British or French manufactures. Thus, interregional trade was limited for lack of complementarity and the abolition of trade barriers and the construction of railways after the Unification could not help much. The industrial triangle, in Cafagna's felicitous expression, was a "small country", not unlike Switzerland or Wallonie, tucked in a much bigger polity. These features of growth started to change only in the 1880s. The state adopted a more aggressive growth policy, including a protectionist tariff in 1887, which helped Northern industries to stave off the foreign competition on Southern markets. Industrial growth in the North and the ensuing increase in disposable income increased the demand for raw materials and above all agricultural products from the South. Since the 1890s, Italy started to export manufactures. However, the gap between industrializing North and still agricultural South continued to widen.

This complex narrative can be summed up in six propositions, a mix of stylized facts and causal hypotheses:

a) Italy specialized in primary products, most notably silk, for the consumption in industrializing countries of North-Western Europe;

b) exports have been main the source of growth for Italy until at least the 1880s;

c) modern economic growth featured a succession of waves of increase in GDP per capita and periods of stagnation rather than a single discontinuity from stagnation to steady-state growth;

d) silk was an exception among primary products for its unique combination of agricultural production and industrial processing;

e) the silk producing areas, most notably Lombardy, spearheaded industrialization and growth, while the rest of the country trailed behind;

f) long-distance trade within Italy was modest both before and after the Unification because North and South were too similar in terms of level of development and resource endowment to benefit from commerce.

How well have these propositions stood the test of time?

a) We now have quite detailed data on Italian trade after Unification (Federico et al 2011) and they confirm Italy's specialization in primary products and the prominent role of silk. Primary products (defined as SITC 1 digit categories 0-4 plus raw silk) accounted for over 85% of Italian exports in the 1860s and for 65% on the eve of World War One. The share of silk fluctuated around a quarter of total exports until the mid-1900s and then it fall quickly, down to about a sixth.

b) In the history of unified Italy, the waves of growth coincided with periods of openness and world prosperity (Rossi and Toniolo 1992). The export/GDP ratio increased from about 7.5% after the Unification to over 11% in the early 1880s and, after a decline to in the next decade, it rebounded to 10.5% on the eve of World War One (Federico and Wolf 2013). However, coincidence in timing does not prove causation, nor causation via export of goods. A pairwise Granger causality test with an error correction mechanism shows that, from 1861 to 1913, GDP caused exports rather than vice-versa (Pistoresi and Rinaldi 2012). Fenoaltea (1988a) suggests an alternative channel of transmission of world cycle to the Italian economy via flows of capital rather than of goods. The world supply of capital fluctuated according to the autonomous decisions by British or French investors. When capital was abundant, all peripheral countries, including Italy, could invest more (mostly in construction) and thus grow faster.

c) Several scholars have looked for wave-like patterns in macroeconomic series after 1861, with increasingly sophisticated time-series analysis. Two recent papers (Ciccarelli and Fenoaltea 2007 and Sella and Marchionatti 2012) confirm the existence of a cycle, with a strong acceleration in the late 1890s, in the series by Fenoaltea (2005). This result is not inconsistent with the interpretation by Cafagna, which does not impose that the rates of growth were similar across waves. Given the broad similarities between movements after 1861, the Malanima (2010) or Baffigi (2011) series are likely to yield similar results.

d) The alleged growth-fostering role of silk has been investigated, as far as possible given the fuzzy nature of the claim and the incompleteness of the available evidence, by Federico (2005). He argues that some of these alleged microeconomic benefits do not stand scrutiny. Silk reeling needed very specific skills, which were useless in other textile branches. The proceeds from sales of silk could be either saved or used for purchasing manufactures, but not for both, as posited by Cafagna. Furthermore, most industrial profits were ploughed back in silk mills, as technical progress of the equipment was very fast. On the other hand, the need of short-term funding stimulated the development of banking and financial system and there is strong evidence of a beneficial effect on engineering. Italy gained since the 1840s a world leadership in the production of machinery for the silk industry, which it maintained until the 1920s. However, the effects were much stronger in the

second half of the 19th century, after a major production crisis in the 1850s, caused by a very serious disease of silkworms, the *pebrine* (Federico 1997). It caused the production of cocoons to fall and their prices to reach a level which only the firms with steam-powered machinery could afford to pay. This triggered a process of natural selection among firms and a wave of investment in steam-reeling in the 1860s and 1870s. Indeed, the growth in Total Factor Productivity was 3-3.5 times faster in silk industry than in the rest of the economy from the 1870s to World War One.[6]

e) There is no doubt that gaps among regions has been widening in the 20th century. In 1891 the GDP per capita in the three regions of the "small country" was about 15% higher than the national average, and about 30% higher than the Southern one (Felice 2011). In the next sixty years the gap grew steadily up to a peak of 151% (52% relative to the nationwide average) in 1951. In contrast, scholars disagree on the size of the gap at the time of the Unification and on its changes in the first thirty years of the new kingdom. Daniele and Malanima (2007), extrapolating backwards Felice's estimate for 1891, reckon that in 1861 the GDP of the South was equal to Centre-North and that a significant gap opened only in the 1870s. In contrast, Brunetti et al (2011) estimate that the gap between the "industrial triangle" and the South was almost as large in 1871 as in 1891. Their view is buttressed by the provincial-level estimates of industrial GDP by Ciccarelli and Fenoaltea (2013) and by the evidence about social indicators. At the time of unification the South lagged behind in all of them but infant mortality (Vecchi 2011) and in 1870 the Human Development Index in the "industrial triangle" was 60% higher than in the South (Felice and Vasta 2012 tab.3).

f) The available data show that transportation by sea and rail grew much faster than total GDP from 1862-1864 to 1911-1913. Traffic on coastal shipping increased by 6.2 times (ISTAT, on-line data-base) and by railways by 13 times (Fenoaltea 1984 tab 3), while GDP grew only by 2.4 times (Baffigi 2011).[7] Unfortunately, these data lump together long-distance North-South trade with local or medium-range traffic (e.g. from the ports to their hinterland). Thus, Zamagni (1983) has estimated interregional trade with net balances (output less consumption) for eleven agricultural products and cotton and wool cloths. She concludes that in 1911 "exchanges were intensive in the industrial triangle and there was a sizeable trade between it and the North-East and Central regions, while trade between the South and the rest of the country, and within the South was extremely modest" (1983 p.1648). As said, Cafagna argued that demand for transportation was limited, while Fenoaltea (1982) puts forward an alternative supply-side explanation. Railways traffic was lower in Italy than in France or Germany because the government kept rates high to maximize its revenues. On the other hand, one

[6] From 1876 to 1911, the annual rate of growth of TFP was 2.2% in reeling and 1.8% in throwing (Federico 1994 Appendix G), while for the economy as a whole it was only 0.6% f rom 1881 to 1911 (Broadberry et al. 2013 tab. 7.6).

[7] The figure for rail is computed from a series of Value Added in maintenance, which is based on an (unpublished) series of total traffic (passengers and goods) per axle/ton/km.

can quote some additional evidence to buttress Cafagna's view. First, the records of Lombard cotton companies (Romano 1992) show that they started to sell in Southern markets only in the 1880s [8] This fact is not so surprising, as most of the potential market for industrial products was in the "small country" or in its close neighbourhood (A'Hearn and Venables 2013). Ciccarelli and Fenoaltea (2010) find that, until World War One, the timing of regional business cycles in private construction diverged, as if North and South did not belong to a unified economy. Last, but not least, Federico (2007) shows that prices of agricultural products started to converge in the 1830s, mostly as a consequence of fall in sea-borne transportation costs, with a modest contribution from the liberalization of wheat trade in the 1850s. Price differentials were already small on the eve of Unification and they fell further only in the 1880s. This result implies that trade costs per se were not an insurmountable obstacle for trade. Nor tariffs could have been, as imports from other Italian states were not subject to differential duties.

Summing up, the research has confirmed most (but not all) Cafagna's hypotheses for the period after Unification. He assumed them to have held also before 1861 and his view is widely shared. However, the discontinuity in GDP per capita (Figure 1) suggests that Italy before the Unification was somehow different and thus it has to be studied on its own.

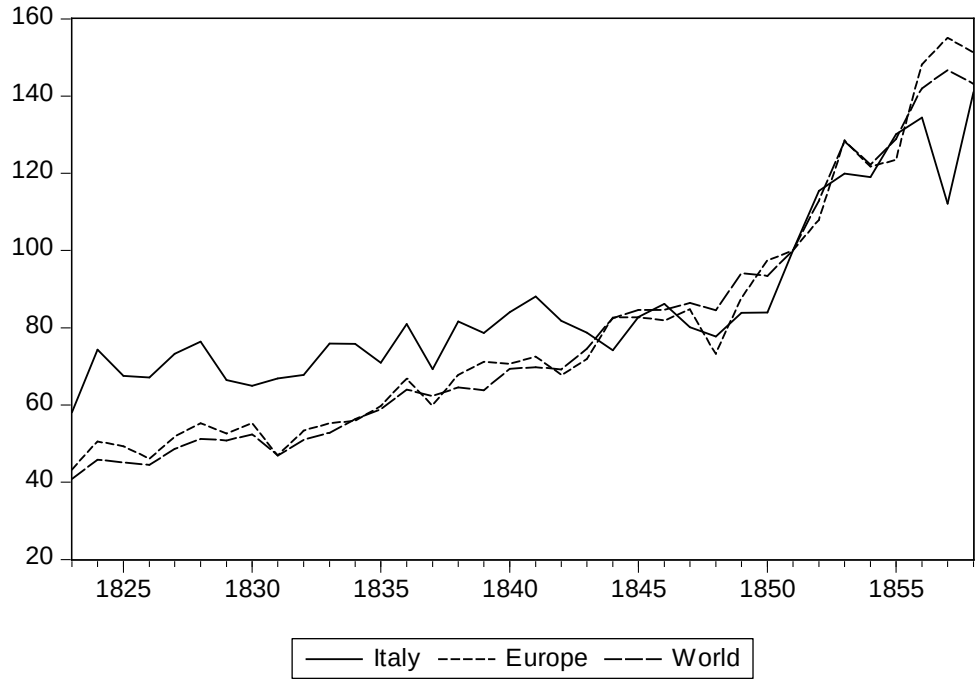
3.- The "Italian" exports in the first half of the 19th century: a comparative view

Figure 2 compares the total exports of Italian states with an estimate of European and world trade. [9]

[8] His evidence contrasts with the view by Capecelatro and Carlo (1982), which is now enjoying a revival in a not scholarly audience. They argue that the Southern markets had been essential for the development of the Northern industry, and that the policies of the new kingdom were instrumental to the destruction of the budding Southern industry.

[9] The series after 1830 covers 47 polities, excluding Italy. We extrapolate backwards to 1823 with a smaller sample of 17 polities. See for a list of polities and all details of construction in Federico-Tena 2013.

Figure 2
Trends in exports, Italy, Europe and the world (1851=1)



Trends differ quite markedly, but for a short period in the early 1850s. World trade has been growing fairly steadily since the beginning of the series, with a clear acceleration around 1850. In contrast Italian exports increased very slowly before the outbreak of First War of Independence (1847), boomed in the early 1850s and stagnated in the second half of the decade. [10] Indeed, Italy's share on world exports decreased from almost 5% in 1830-1832 to a minimum of 3.2% in 1848-1850 and then remained constant, with a short-lived and modest recovery in the early 1850s. This decline contrasts starkly with the performance after the Unification. The Italian share on world trade (a wider sample of covering 100 polities) increased from 2.2% in the mid-1860s to 3.1% in the early 1880s and then it declined slowly to 2.7% on the eve of the war.

One might argue that the series of world exports are not the right yardstick to assess the performance of a peripheral country, as most of them originated from a handful of big developed countries. France, Zollverein, United States and United Kingdom plus India accounted for about 60% of the total third in 1851. Thus, Table 1 compares Italy with other peripheral (and core) countries. [11]

[10] A Quandt-Andrews tests single out 1851 (for Italy) or 1852 (for world total) as the most likely structural breaks in the series.

[11] It is possible to run time-series regression (cf. footnote 1) only for the period 1831-1858. All other rates are computed as log change between three-years moving averages (e.g. 1824 is the average 1823-1825).

Tab. 1
Growth of exports and openness: Italy in comparative perspective

	Export per capita (1913 $)				Rates of change			
	1831	1850	1858		1824-32	1832-51	1851-57	1832-57
Italy	2.1	2.7	3.4		0.6	1.9	4.3	2.68***
United Kingdom	5.6	10.8	17.0		0.1	3.6	7.8	4.35***
United States	6.4	8.9	10.2		4.7	4.6	5.3	4.83***
European Core	2.7	5.3	7.5		2.3	4.2	6.2	4.46***
European Periphery	1.2	1.6	2.0		0.6	2.4	5.4	2.65***
Western Settlement	14.4	19.9	27.8		4.6	5.3	9.9	7.11***
Asia	0.2	0.5	0.6		0.5	4.6	3.0	4.06***
Latin America	5.3	6.1	7.1		4.0	2.1	3.7	2.65***
Africa	0.4	1.2	1.8			7.0	7.4	6.21***
World	1.0	1.8	2.5		1.7	3.7	5.7	4.12***

*** significantly different from zero at 1%
Source: Federico and Tena (2012)[12]

Italy's performance was decidedly disappointing. The long-run rate (last column on the left) is significantly lower than any other group except the European periphery and Latin America. In the 1830s and 1840s, the rate of growth of Italian exports was the seventh nine lowest, above Portugal, Austria-Hungary and four Latin American countries (Mexico and three Caribbean ones), whose exports actually declined. During the export boom of the 1850s, Italy climbed many positions in this ranking, but it still remained below the median. Consequently, export per capita, a crude index of openness, declined from being two times greater than the world average (including China and India) in 1831 to being only a third higher in 1858.

One should conclude that Italy exploited poorly the opportunities of the early globalization, but this statement is open to two distinct objections. First, the series might undervalue exports to core countries, if Italy was re-directing its wares away from slow-growing Mediterranean countries towards Northern Europe. Second, exports from core countries may not measure accurately their demand for imports. Figure 3 tackle this latter objection by computing the shares of Italy and other peripheral countries on imports (3a) or GDP (3b) of five countries (United Kingdom, France, Belgium, Netherlands and the United States). We normalize the series with 1851=1 to make levels more comparable across groups of polities.

[12] Population data for Italy Romani 1982 p.395, for Austria-Hungary Mitchell 2005 and for other countries Maddison 2010, linearly interpolated when necessary.

Figure 3 a)
Share of exports from periphery on imports of core countries (1851=1)

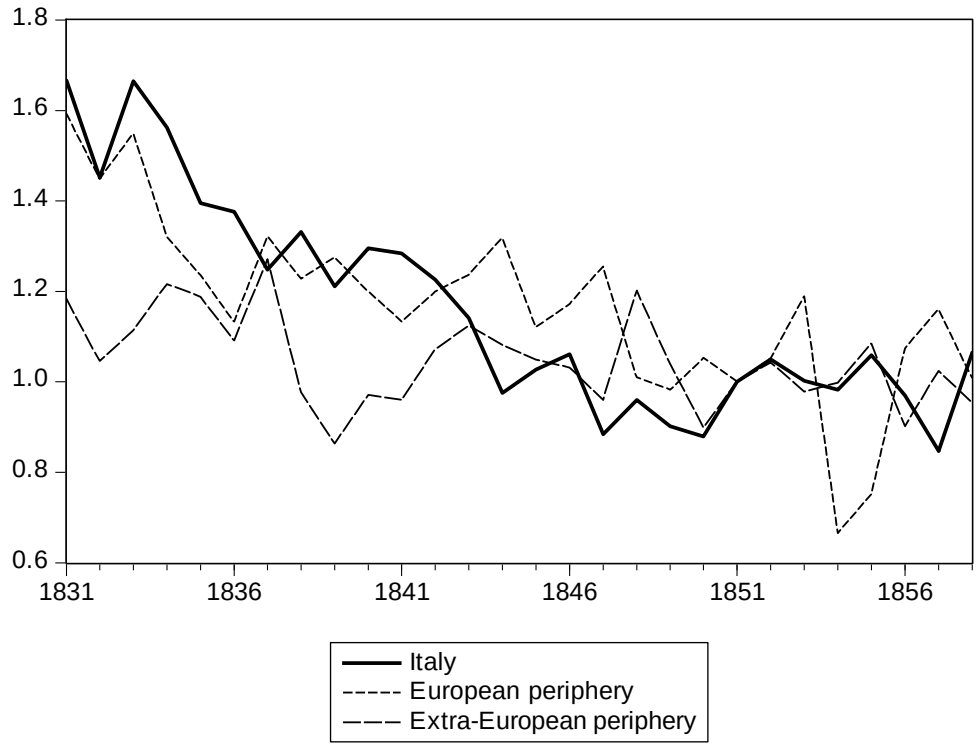
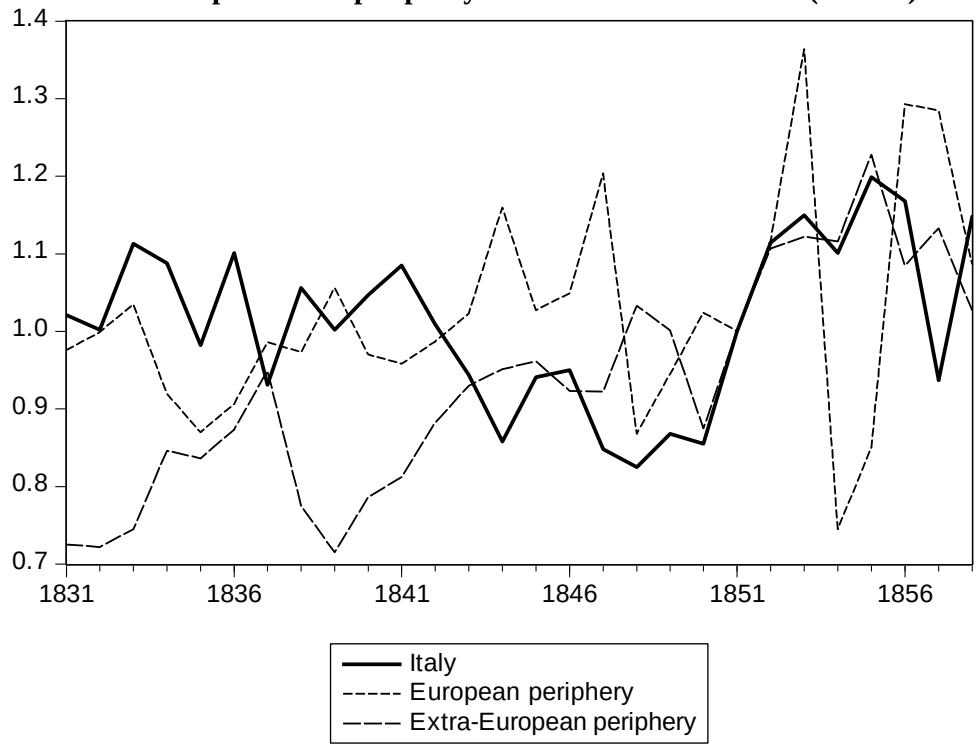


Figure 3 b)
Share of exports from periphery on GDP of core countries (1851=1)



The series fluctuate a lot, but the massage is fairly clear. Extra-European countries performed better than European periphery, in spite of the slow growth of exports from Latin America, and the European periphery performed better than Italy, especially in the 1840s.

It is more difficult to address the first objection for lack of data on destination of Italian exports. The only available data do show an increase in the share of exports from the Kingdom of the Two Sicilies to core countries. [13] However, the trade statistics of importing countries confirm that Italy was losing market shares (Table 2).

Table 2
Share of Italy on the imports of core countries

	France	Belgium	UK	USA
1823-25	27.97		2.77	1.79
1831-33	16.29	0.35	2.14	1.68
1850-52	13.96	0.69	1.85	1.23
1856-58	10.70	0.56	0.97	1.35

Source: World Bilateral Trade Data Base (V. 01-2013) from MCI: ECO2011-25713 Research project: "Globalización y crecimiento en los países de la periferia europea y latinoamericana entre 1820 y 1940" .

The data omit exports from Lombardo-Veneto, which were classified as coming from Austria-Hungary. However, it seems implausible that this addition could change the results. In fact, the area exported almost exclusively silk (Table 3), and, as we will detail in the next Section, Italian silk was losing ground on British and French markets.

This discussion so far has considered Italy as a unit, but by then Italy was, as the Austrian chancellor Metternich once famously said, a "geographical expression". The level of openness and the rate of growth of export might have differed between states. In particular, the conventional wisdom emphasizes the difference between the progressive and modernizing "small country" and the rest of the peninsula, backward and stagnating. Does the evidence support this distinction?

[13] The United Kingdom, France, Netherlands and the United States absorbed 38% of exports from continental South in 1838-1840 and 48% in 1856-1858 (Graziani 1960). Adding half of export to Austria (the rest by assumption went to Lombardo-Veneto) the shares rise to 48% and 58%. The total share of the United Kingdom, United States and France on exports from Sicily rose from 59% in 1841 to 74% in 1853 (Battaglia 1983).

4.- The exports in the first half of the 19th century: a regional analysis

We start with a snapshot for the 1850s, when data are more abundant and more reliable (Table 3).[14]

Table 3
The trade of Italian states, 1850-1858

a) Imports

	Total (mil 1913 $)	Per capita ($)	% Italy	% primary	% Man	% silk
Sardinia	31.8	7.17	34.6	61.5	23.2	15.3
Lombardo-Veneto	22.4	4.38	24.4	42.9	52.9	4.1
Duchies	5.4	4.95	5.9			
Tuscany	11.9	6.72	12.9	50.6	48.0	1.4
Papal States	5.9	1.91	6.5	20.0	79.6	0.4
South	8.7	1.26	9.4	12.4	87.6	0.0
Sicily	5.8	2.61	6.3			
Italy	91.9	3.74	100			

b) Exports

	Total	Per capita	% Italy	% primary	% Man	% silk
Sardinia	17.5	3.94	21.8	51.8	7.6	40.5
Lombardo-Veneto	27.0	5.29	33.7	7.7	14.3	78.0
Duchies	4.5	4.16	5.7			
Tuscany	8.2	4.62	10.2	30.8	61.3	7.9
Papal States	6.1	1.97	7.6	51.0	37.4	11.6
South	7.8	1.14	9.8	30.3	47.3	22.4
Sicily	9.0	4.03	11.2			
Italy	80.2	3.27	100			

Sources: Appendix A tab. A1

The table highlights three main points:

a) The level of openness was, as expected, higher in Centre-North than in the Papal States and in (mainland) South if measured with export per capita. The Lombardo-Veneto exported roughly as much as France (5.48 $) and more than Zollverein (4.61) in the same years, while mainland South less

[14] In 1871, Piedmont and Liguria jointly accounted for 85% of population and 89% of GDP of the Kingdom of Sardinia and Lombardy for 61% and 64% of the Lombardo-Veneto. Thus the "small country" accounted for 75% of GDP and for 72% of population of the two polities.

than Russia (1.22). However, a crude estimate of export/GDP ratio yields a somewhat smaller dispersion.[15] The most open polity was Tuscany (9.2%), the least open Papal States (3.0%) and mainland South (2.0%), while all other polities clustered around 7% (Sicily, the Duchies and Sardinia 7.0%, Lombardo-Veneto 6.8%).

b) the total trade balance was in deficit, largely because Sardinia and Tuscany imported much more than they exported. These were the two most free-trade countries in Italy. Tuscany had a long tradition of free trade while Sardinia was a recent convert (Di Gianfrancesco 1974). It progressively liberalized imports, slashing duties on manufactures from 42.2% in 1846 to 17.3% in 1853 12.6 1859 and abolishing altogether duties on wheat after 1854 (Federico 2012 and Tena et al 2012, on-line appendix, un-weighted average). Other countries were either exporters of agricultural products or let them enter free of duty, with the partial exception of wheat, but protected their industry heavily. In 1859, the average duty on manufactures was 29.3% in Austria and 23.2% in the Papal States.

c) The data on overall composition of trade have to be treated with caution, as the authors use the Italian classification of the 1950s, which includes in manufactures many products, such as olive oil, which the SITC classifies, more correctly, as primary products.[16] Silk accounted for most of exports from the Lombardo-Veneto, was the main item for Sardinia and the second largest in all other states. However, exports were as a rule fairly diversified: the four main products, including silk, accounted for about a half of total exports in all states, except Lombardo-Veneto. [17]

Thus, by and large, the situation in the 1850s tallies with the conventional wisdom. This is not the case for changes in time, as Table 4 shows.

[15] The figures are obtained as $(T_i/T_{IT})*(GDP_{IT}/GDP_i)*R$, where T trade, R the Italy-wide ratio export/GDP and subscripts refer respectively to the i-th polity and to Italy. We estimate GDP by polity at 1858 borders with data on GDP per capita from Brunetti et al (2011) in 1871 and on population from Romani (1982), assuming that regional differences in GDP had remained constant from the 1850s to 1871.

[16] This statement does not hold true for Sardinia, as we allocate according to modern categories the products listed by Romeo (1976). The data refer 1857-1859 and cover only 64% of total exports. The figures in Table 3 are computed allocating the other exports between primary products and manufactures according to the respective shares on covered products. We omit Sicily and the Duchies for lack of data.

[17] The share was 46.7% for Tuscany (straw hats, silk, chemicals and paper works), 53.7% for the Papal States (hemp, silk and by-products, wheat and cattle), 54.5% for Piedmont (silk and by-products, rice, wheat and cattle) and 65.1% for the South (olive oil, silk, wheat and oilseeds).

Table 4

Growth of exports and openness: Italian states

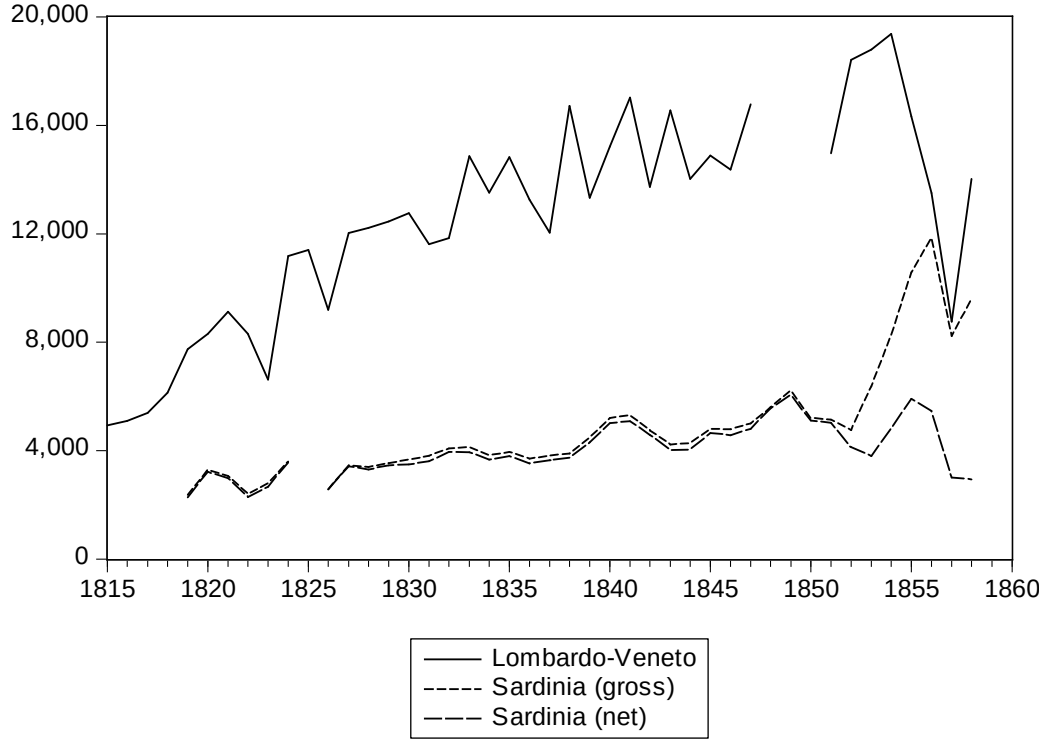
	Export per capita (1913 $)					Rates of change			
	1823	1831	1850	1858		1824-32	1832-51	1851-57	1832-57
Sardinia	2.04	2.61	2.58	4.85		2.23	0.55	10.74	3.00
Lombardo-Veneto	3.65	3.33	3.23	5.18		-1.78	2.36	-0.07	1.77
Duchies			2.55	4.59				4.24	
Tuscany			2.98	6.09				12.20	
Papal States	1.14	1.74	1.87	2.21		3.76	1.31	1.18	1.28
South		0.83*	1.17	1.25			1.80	0.35	1.45
Sicily	1.72	1.43	3.26	4.58		4.21	3.97	3.42	3.84
Italy	1.88	1.98	2.32	3.64		0.62	2.14	4.30	2.66

*1832

Contrary to Cafagna's hypothesis, the performance of the "small country", and especially of the Lombardo-Veneto, was not particularly good. Its exports fell in the second half of the 1820s, increased (not so fast in comparative perspective) in the 1830s and 1840s and fell again in the 1850s. Thus, the long-run rate of growth barely exceeded the rates of the South or the Papal States, which nobody has ever regarded as powerhouses of Italian development. Sardinia fared better, but mostly thanks to an impressive growth in the 1850s, which might be partially spurious. In fact, we suspect that total Sardinian figures include some transit trade, and a conservative estimate suggests an overvaluation of about a tenth in 1857-1859 (see Appendix A). In this case, the growth rates of export from Sardinia (and from Italy) should be correspondingly reduced.

The somewhat disappointing performance of Lombardo-Veneto and Sardinia (before 1850) reflects the sluggish growth in their silk exports (Figure 4).

Figure 4
Exports of silk, Lombardo-Veneto and Sardinia (quintals)



Until the 1850s, exports of silk from Piedmont grew quite smoothly, at little less than 2% per year. [18] The long-run rate of growth of export from Lombardo-Veneto was a tad higher, but trends were far from smooth: exports boomed 1815-1817 to 1829-1831 (increasing by 1.5 times, at the yearly rate 6.5%) and then slowed down markedly [19]. Overall, silk exports doubled in 35 years. This may seem a good performance, but it pales relative to the growth of demand in the European advanced countries. [20] The Italian shares on French imports fell from 82% in 1831-33 to 56% in 1849-1853 and on British ones collapsed from 50.0% in 1825-1830 to 13.7% in 1850-1854 (Federico 1994 tab.XXXV). Italian

[18] The rate from 1821 to 1855 was 1.94% per year (Romeo 1976 tab. II). The smooth growth is somewhat surprising in light of the massive policy change in 1834. Until that date, Sardinia had prohibited exporting raw silk, in order to foster its throwing industry. It is widely assumed that large quantities of raw silk were smuggled out of the country. If it were the case, the lifting of the ban should have boosted total exports and there is no such growth. In fact, total exports of silk declined by 5% from 1832-1834 to 1835-1838 and the share of raw silk on net exports remained below 10% even after 1834.

[19] The rate was 2.15% from 1817 to 1855 (Glazier 1966 prospetto A).

[20] We here focus on Lombardo-Veneto and Sardinia, as in 1853-55 they accounted for 68.5% and 18% of total Italian exports from Italy excluding Sicily. However, other countries did not fare better: silk exports from Papal States increased at 1.75% per annum from 1822-1824 to 1852-1854 (Bonelli 1961 pp.180-181) and exports from the mainland South fluctuated without a clear trend. The only exception is Sicily, at least according to Battaglia (1983). Exports jumped from 27 tons in 1834-1839 to 178 tons in 1850, an increase too large to be totally credible.

silk exports undoubtedly suffered the growing competition from India (Ray 2011:88-132) and from China, spurred by the liberalization of Canton trade in 1833, but they were hampered by supply-side problem. In fact, according to the least unreliable estimates, production increased only by half from the late 18th century to the early 1850s, and exports rose from two thirds to three quarters. [21] It is difficult to single out the main bottlenecks for supply before 1850, although the shortage of land to plant mulberry is a plausible candidate. There is no doubt that the pebrine explains the collapse of silk exports in the 1850s. It damaged more the Lombardo-Veneto, which exported almost exclusively silk, than Sardinia (Table 3).

The stagnation of exports of silk and olive oil explain the poor growth of exports from the South, in spite of the successes of minor products, such as madder, dried fruit, wool and hemp (Graziani 1956-1957 and 1960). If exports of silk and oil from Continental South had been growing as much as all other exports from 1838 to 1855, total exports would have grown as much as exports of Sicily. The main export from Sicily was sulphur, and indeed the exported quantity doubled from 1832 to 1850 and then doubled again up to a peak in 1859 (Squarzina 1963 tab 1). However, all exports from Sicily (sumac, citrus fruits, olive oil) grew quite fast in the period, and the share of sulphur fluctuated between a third and a half of total exports.[22]

So far, we have argued that export growth was slow, but one might argue that any growth could be useful when the rest of the economy is stagnating. Actually, even in the best case, the effect on overall growth was minimal because they accounted for a small proportion of total GDP. In the mid-1820s, the export/GDP ratio was around 4% for the Centre-North, and possibly about 3% for the whole peninsula.[23] It barely changed until the early 1850s and then rose up to a peak of 7.2% in 1855 (6% in 1856 for the whole country). Thus, even during the 1850s, exports could have added at most 0.3-0.5 points to the yearly growth rate (or perhaps prevented a similar fall). Furthermore, this figure is an upper bound, as it assumes that the increase in exports would translate into an equivalent growth in GDP. This would be possible if the production of exportable purchased no inputs from other sectors, and used factors which would have been unproductive elsewhere (the so-called vent for surplus growth). These conditions seem not realistic for a densely populated country as pre-Unification Italy.

[21] At the end of the 18th century, Italy produced 2480 tons of silk and exported 1680 tons (Battistini 2003 tab A1), while in the early 1850 it produced 3700-3800 and exported about 2800 (Federico 1994 tab.Xa). Thus exports rose from about two thirds to three quarters of Italian output.

[22] Battaglia (1983) provides series of exported quantities for 1821-1839 and for 1850. The share of sulphur is computed by multiplying the data on exports from Squarzina (1963 tab.1) by the price in London from Gayer-Rostow Schwartz (?).

[23] Malanima (2010) series of GDP, in 1911 lire, is converted in 1913 dollars, with the market exchange rate. The series refers to Centre-North and thus the computation might be biased if trends in GDP were different in the South. This figure is obtained by assuming that the GDP of the Kingdom of Two Sicilies was 40% of the Italian total as in 1871. Malanima (2002 pp.318-319) suggests a 5% ratio for Centre-North since the 15th century.

In an alternative, purely neo-classical, world of full employment of factors, an increase in exports would augment the GDP only by the difference between the Total Factor Productivity in the production of exportables and of domestic market, times the initial share of exports on Value Added. As said, since the 1870s productivity grew much faster in silk processing than in the rest of the economy, but it is doubtful that the differential had been as large before 1850. Even if it had been as large, however, the contribution would have been very small, as the production of silk accounted for about 0.5% of total Italian GDP in the 1860s.[24] There is no comparable estimate of TFP growth for any other production for exports, before or after the Unification. However, the anecdotal evidence seems to rule out any major technical progress in the production of exportables. For instance, the exports of Sicilian sulphur boomed because the island enjoyed a world monopoly (e.g. Squarzina 1963 for sulphur from Sicily). In short, the evidence, albeit incomplete, suggests that the macroeconomic stimulus from exports was negligible in all Italian states.

5. A digression: imports of capital and economic growth

We know very little about the world capital market in the first half of the 19th century. However, Flandreau and Flores (2009) have shown that a European sovereign bond market developed since the 1820s and Kaminsky (2010) has measured the fluctuations in supply with the issues of bonds on the primary market. Capital was abundant in the 1820s and in the late 1840s- early 1850s, and this abundance of capital might have fostered imports of capital in Italy, with positive effects on investments and GDP. Testing this hypothesis is however difficult, as there are no data on the balance of payment of any Italian state before 1861. In the following, we use two different proxies, the paid-up amount from issues of Italian bonds on the European market, from Conti and Schisani (2011) and the ratio import/export by country.[25] We report them respectively in Figure 5 and 6.

[24] The figure is the share of Value Added in reeling, throwing and weaving from Fenoaltea 1988b on total GDP from Baffigi (2011). Most of the value of silk came from the production of cocoons – i.e. is included in VA of agriculture.

[25] Conti and Schisani (2011) do not report information on the issue price for some bonds We estimate it on the basis of prices of bonds of the issuing polity on the Paris stock exchange (Gille 1968 pp.35 and 117-119). We omit Tuscany because we have trade data only for 1850-1858, when imports exceeded exports by 50%. Furthermore, we consider trade according to homogeneous monetary units – i.e. we use the original Glazier series (omitting Austria) and we sum together mainland South and Sicily.

Figure 5
Imports of capital and per capita GDP, 1821-1858

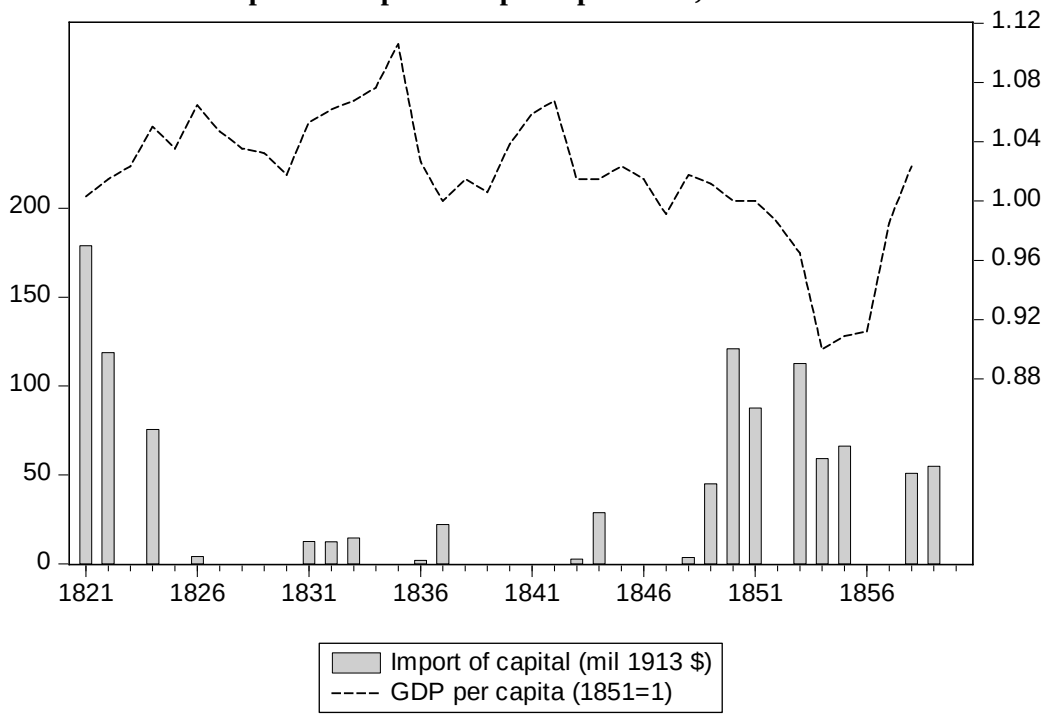
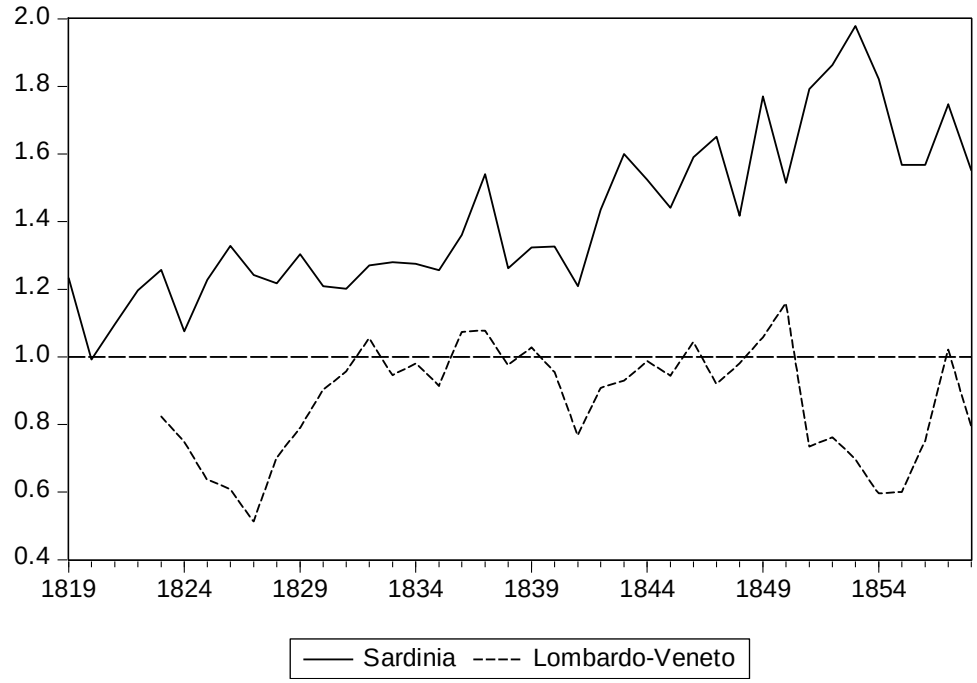


Figure 6

Ratio import/exports



Before delving into the interpretation, it is necessary to warn that both measures are quite crude proxies. The import/export ratios are computed at constant, not current prices, and by definition they cover only trade, omitting all other items in the balance of payments (trade in services, emigrants' remittances and so on). The data on issues omit the Lombardo-Veneto, as part of the Austrian Empire, and all private foreign investments (Gille 1968). They neglect the purchases of Italian investors from foreign banks at the emission and on the secondary market. The only evidence on these transactions is the share of interest on state bonds paid abroad, and thus presumably to foreign investors. The share in 1861 was about 20% (Zamagni 1998 tab.L), but it was likely to have been higher 1858.[26]

Neither measure of capital inflow, although imperfect, shows much coincidence with fluctuation in GDP per capita (Figure 5).[27] However, looking at country cases, some interesting patterns emerge. First, two polities, Lombardo-Veneto and the Kingdom of the Two Sicilies run trade surpluses for most years – and thus, at least in theory, they should have exported capital. Actually, the Kingdom of

[26] The Italian states, including, pro-quota, the Lombardo-Veneto, owed 1.3 million in 1858 (Corbino 1931 I p.309). However, in the next three years they borrowed heavily to fund the war and the expenditures to organize the new state so that the total debt more than doubled (Francese-Pace 2008). It is likely, given the political turmoil and the uncertainty surrounding the new state, that most of the new debt was subscribed in Italy.

[27] The coefficient of correlation between the Malanima series and the ratios are negative in all cases, but the Kingdom Two Sicilies, where it is almost zero (0.04). The pair wise correlations between ratios are on average negative, ranging from a maximum of 0.52 (between Two Sicilies and Lombardo-Veneto) to a minimum of -0.94 (between Sardinia and Lombardo-Veneto).

Two Sicilies had borrowed heavily in 1821-1824 (up to a third of total issues of Italian states) but these sums had not remained in the country. They were used to refund earlier loans from Austria and to pay the maintenance of the Austrian troops which had helped to suppress the 1821 uprising (Ostuni 1992). The trade of the Papal States, Sardinia and possibly Tuscany was permanently in deficits and indeed they borrowed heavily abroad, albeit for different purposes. The Papal States borrowed regularly abroad to fund their current expenditures (Felisini 1990). The Kingdom of Sardinia borrowed huge sums (about 2-3% of the GDP each year) in order to fund its wars against Austria but also the construction of railways.[28] These investments may have fostered economic growth, as suggested by Fenoaltea for the period after 1861. According to the Malanima (2010) series, the 1850s were the darkest years of the whole pre-Unification period, but without state-specific data on GDP, one cannot rule out that the performance of Piedmont and possibly of Tuscany was substantially better than the other areas of the Centre-North.

5.- Interregional trade in the 1850s

As expected, our estimate confirms that interregional trade in the 1850s was very low (Table 5)

Table 5
Shares of interregional trade on total trade

	Import					Export		
	1850-52	1856-58	1850-58			1850-52	1856-58	1850-58
Sardinia	14.4	21.1	18.1		Sardinia	13.4	12.9	12.9
Lombardo-Veneto	18.1	17.5	17.7		Lombardo-Veneto	13.0	22.4	15.9
Duchies	47.6	30.9	37.3		Duchies	46.3	52.3	46.8
Tuscany	8.2	8.3	8.7		Tuscany	23.7	22.7	23.6
Papal States	18.1	15.1	16.1		Papal States	15.7	22.7	18.8
South	15.9	14.6	15.1		South	31.2	24.7	27.0
Sicily	8.9	8.9	8.9		Sicily	4.6	4.6	4.6
Italy	16.5	17.5	17.0		Italy	17.5	20.6	18.4

Source: Appendix A

[28] We estimate the share of imports of capital on GDP in 1850-1858 with two different methods. We compute the ratio of total loans to GDP, both expressed in 1911 lire, or we multiply the total deficit in the same years (on average about half of exports) by the average export/GDP ratio. The first method yields a yearly import around 2.1% of GDP, the second around 3.2%.

The Italy-wide shares tally well with the estimate by Vera Zamagni, based on the early work by Correnti and Maestri, the two leading Italian statisticians of the time. She reckons that on the eve of the Unification, trade with other Italian states accounted for 18.9% of imports and for 17.6% of exports (Zamagni 1983 tab. 3). The shares by country, especially for the Lombardo-Veneto, differ more, but the coefficient of correlation with our estimate for 1858 is 0.87 for exports and a still reassuring 0.71 for imports.

Table 6 report our estimate of bilateral trade flows.

Table 6
Bilateral trade: per capita imports, average 1850-1858 (1913 $)

	Sardinia	Lombardo-Veneto	Duchies	Tuscany	Papal States	South	Sicily
Sardinia		0.43	0.27	0.27	0.08	0.14	0.10
Lombardo-Veneto	0.26		0.12	0.08	0.08	0.18	0.04
Duchies	0.26	1.34		0.08	0.08	0.05	0.04
Tuscany	0.18	0.17	0.04		0.08	0.08	0.04
Papal States	0.03	0.04	0.04	0.04		0.11	0.04
South	0.08	0.05	0.10	0.02	0.02		
Sicily	0.05	0.10	0.02	0.07	0.04		

Sources: Appendix A.

About half of the interregional commerce consisted in short-range flows between Lombardo-Veneto and other polities in the North. Economic relations in the "small country" pre-dated the Unification and, thus, by far, the industrialization. Such a geographical concentration is not really surprising: ceteris paribus, bilateral trade is inversely proportional to transport costs, which gravity trade models routinely measure with distance. It is widely assumed that the lack of railways and by the poor state of roads increased transportation costs in pre-Unification Italy. Thus, one would expect the coefficient of distance to be very large. We test this hypothesis with a very basic gravity model, which explains bilateral trade with distance by sea (DISTANCE) and the combined economic size, proxied by the average population in the decade (POPULATION) or by GDP in 1871. [29] Likewise, one would expect

[29] Population of pre-Unification polities from Romani 1982 p.359, GDP Brunetti et al 2011, sea distance from http://sea-distances.com/ (accessed August 2012). We select one main port for Sardinia (Genoa), Lombardo-Veneto (Venice) Tuscany (Leghorn) and for Sicily (Palermo), while for Papal states and the South we average distances with one port each on West coast (Civitavecchia and Naples) and one on the East one (Ancona and Bari). The distance between Sardinia and Lombardo-Veneto, which shared an overland border, is birds' flight distance between Turin and Milan. The distance of Duchies to non-landlocked states is the sum of overland distance to Genoa and then the sea distance. We have also experimented with a weighting scheme to take into account the higher cost of overland transport, with coefficient ranging from 1 to 4, but results are very similar.

that allegedly high tariffs of the South hampered trade. Unfortunately, it is impossible to test this hypothesis, as there are not enough data on total tariffs, let alone on bilateral ones. Thus, we try to capture this effect by adding a dummy for the pairs including the Kingdom of Two Sicilies.

Table 7
Determinants of bilateral trade

	(1)	(2)	(3)	(4)
Const	-8.75	0.16	-11.21	-0.65
	(2.65) **	(0.12)	(4.56) ***	(0.60)
LnDistance	-0.92	-0.915	-0.74	-0.76
	(4.68) ***	(5.21) ***	(4.61) ***	(4.92) ***
LnPopulation	1.56		1.75	
	(4.56) ***		(6.49) ***	
LnGDP		1.86		1.93
		(5.45) ***		(6.80) ***
Two Sicilies			-0.78	-0.62
			(3.61) ***	(2.96) ***
R^2	0.65	0.72	0.79	0.81
Fstat	18.3	25.1	25.1	27.3

Significant at * 10%; ** 5%; *** 1%
N=20; t-stat between brackets

Results are quite good. The R2 are high enough and the residuals exceed the 95% confidence band in three cases only: the model under-predicts trade between Sardinia and the Duchies and between Lombardo-Veneto and Tuscany and over-predicts trade between Duchies and the South. Elasticities are correctly signed, highly significant and values are plausible. The coefficient of distance in the baseline specification (eq. 1 and 2) is almost identical to the average of contemporary estimates (-0.91), as reviewed by Disder and Head (2008). The Southern dummy (eq. 3 and 4) is negative as expected and its addition shifts the coefficient of distance towards the lower bound of the range of contemporary estimates. The low cost of sea-borne transport must have compensated the high cost of overland trade.

6.- Conclusions: what did start modern economic growth in Italy?

In the introduction we set ourselves the task to test three hypotheses about the economy before the Unification – i.e. that exports and/or capital imports were the main (or sole) source of growth and that interregional trade was limited for lack of complementarity. Our empirical analysis confirms that the trade between Italian polities before 1858 was modest and very concentrated in the Po valley. The results of our gravity model suggest that transportation costs were not the sole cause of this concentration. However, the lack of complementarity is only one possible additional cause of low

trade. The Italian market might have been segmented by other cultural and institutional barriers as the German and Austrian ones towards the end of the 19th century (Wolf 2009, Shulze and Wolf 2009, Wolf et al 2011).

Our analysis has found only very limited support for a growth-fostering role of capital imports and no support to the hypothesis of an export-led growth, and, above all, of an export-led growth in the "small country" before Unification. Imports of capital may have fostered investment and growth only in Piedmont and Tuscany in the 1850s. For most of the period, Italian exports grew slowly, and not much faster than population and the spurt of the early 1850s was truncated by the outbreak of the *pebrine*. Given the very low ratio to GDP, the macroeconomic effects of exports of goods must have been negligible. There is some evidence of positive microeconomic effects from exports of silk, although not from exports of other products. However, they were much stronger during the investment boom of the 1860s and 1870s than before the Unification. These results rule out a major external pull to modern economic growth and thus indirectly buttress Malanima's view of a stagnant economy. On the other hand, our comparative analysis shows that Italy largely missed the opportunities offered by the growth of demand of industrializing countries of North Europe. Thus, the roots of Italian stagnation have to be searched at home.

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Appendix A
An estimate of 'Italian' trade before the Unification

1.- Introduction

The reader will notice the difference in coverage between total trade and trade by country. The former is fairly good since the late 1820s and almost complete since 1851, with the exception of the Duchies. Data on trade by country are available only in the 1850s, and also for that decade there are sizeable gaps. Thus we will work backwards, focusing initially on the 1850s. In the next Section, we estimate total trade at constant (1851) prices and current borders. In Section Three, we estimate trade at 1913 borders, and the difference is our estimate of interregional trade. Last but not least, in Section Four, we extend backwards only our series of total exports at current borders to 1823.

Table A.1
Lists the available sources on trade of Italian polities before the Unification

	Total trade		Data by Countries	Sources
	Current	Constant		
Sardinia	1852-1859	1819-1859	1853-1858	Romeo (1976)
Lombardy	1814-1828	1829-1858	NA	Glazier (1966)
Veneto	1823-1828	1829-1865	NA	Glazier (1966)
Tuscany	1851-1855	1851-1859	NA	Parenti (1959)
Papal States	NA	1818-1858	NA	Bonelli (1961)
South	NA	1832-1858	1832-1858	Graziani (1960)
Sicily	1827-1853	NA	1841 and 1853	Battaglia (1983)

In our estimate, we take the data at their face value, ignoring two potential problems. First, contrary to 19th century (and current) conventions, some trade statistics might include transit, swelling both exports and imports by the same amount. For instance, exports from Sardinia in the 1850s included substantial flows of wheat, which Sardinia traditionally imported, and cotton, which did not grow in the country (Romeo 1976 tab. IV). Furthermore, imports of silk, which had fluctuated between 100 and 200 quintals throughout the 1830s and 1840s, started to rise quickly, up to 6650 quintals in 1858 (Figure 4). Part of these imports consisted of Lombard raw silk to be thrown, but Sardinia imported also substantial quantities of thrown silk, which was in all likelihood in transit. Omitting from exports product less likely to be of local production (wheat, sugar, hemp cotton and wool) reduces the value of exports in 1857-1859 by about a tenth. This overvaluation at the end of the period biases upwards the rate of growth of export, but the size of the bias cannot be determined without knowing when transit started to be recorded spuriously as export. If, for instance, the practice started in 1850, the actual yearly growth rates in the 1850s would be 8.99% for Sardinia and 3.87% for Italy rather than 10,74% and 4.30%.

Second, many sources, including some of the ones we are using, claim, rather plausibly that smuggling was extensive (Glazier 1966 pp.42-44, Bonelli 1961 pp.16-19, Parenti 1959 p.8, Graziani 1960 p. 5). Unfortunately,

these general statements are not supported by enough evidence. The sources do report some extremely tentative estimates about the amount of smuggling, which may have reached a half the registered trade for imports. These benchmark figures are anyway hardly useful without information about the movements of this share, which must have changed according to the trade policy and the efficiency of repression. Furthermore, very high rates of smuggling are somewhat in contrast with the trade deficits which the trade statistics show for most polities and most years. Adding extensive smuggling would augment the deficit to rather implausible levels. For these reasons, we will refrain from speculating further on the issue and adding sensitivity test. However, the reader must be warned that all our estimates may undervalue trade, especially on the import side, and that the bias may be changing in time.

2.- The series by polity: total trade

i) Sardinia

Romeo (1976) relies for the period 1819-1843 on unpublished archival material and afterwards on the official Trade statistics Sardinia (ad annum). His data refer until 1848 to the mainland territories of the Kingdom (Piedmont and Liguria) only and afterwards to the whole Kingdom. Before 1851, they are at "official" prices, which are essentially 1821 prices with erratic updates by the custom offices and then at "commercial" prices, which were updated yearly (i.e. current prices). Romeo (1976 tab. III G) estimates trade at constant prices by multiplying the quantity of trade by 1819-1821 prices. He produces two distinct series for 1819-1848 (excluding Sardinia) and for 1849-1859 (including Sardinia), which we join by assuming that trade remained constant in 1848 and 1849, two war years. We thus obtain an index (1851=100), which we simply transform into a series at 1851 prices.

ii) Lombardo-Veneto

Glazier (1966) patches up his series for Lombardy (1814-1858, with a gap in 1848-1849) and Veneto (1823-1865, with a similar gap) from three different sources. For the years to 1828 he relies on the so called "balance of trade" – i.e. statistics of Lombardy and Veneto, which report data at current prices. For the period 1840-1866 he extracts the information on trade of the two provinces available in the trade statistics of the Austrian Empire. These data are in "official" prices, which remained constant from 1840 to 1851, and were updated in 1852, 1854, 1858 and (for Veneto only) 1862. Glazier adds some data on traded quantities from commercial sources to obtain a series of trade 1851-1858 (to 1865 for Veneto) at 1858 prices. These two sources leave a gap for the period 1829-1839, which he fills with his own estimate. He claims to have collected data of imported and exported quantities for the main products from a number of archival sources and then to have estimated the series of total trade with some set of prices. He does not specify which products he covers, although he does publish some very scattered quantity data for few products (Glazier 1966 tab A and B).[30] He never mentions the source of prices and thus it is not clear whether the series is at current or constant prices. The latter hypothesis is however on balance more plausible: the coefficient of correlation with the series of exported quantity of silk is 0.94, while deflating the export series with silk prices (De Maddalena 1974) yields a rather implausible fall in the 1840s.

[30] The only consistent series refers to silk exports, but there are some small differences between the figures in Prospetto A (which we use) and those in Tables A-1.

As a first step in our estimation, we convert the Glazier's series for the 1850s from 1858 to 1851 prices. Otherwise, although movements in time would remain unaffected, total trade would be biased upwards relative to other polities, as prices in 1851 were decidedly lower than seven years later. On the export side, we use the price of silk (De Maddalena 1974), while for exports we average export prices indexes from the United Kingdom, France and Austria. [31] As a second step, we adjust the Glazier series after 1840 to the actual boundaries of Lombardo Veneto. In fact the official Austrian statistics omit the trade with other provinces of the Empire over the whole period 1840 to 1858 and the trade with the Duchies, from August 1852 to October 1857, when the two countries established a custom union. We obtain yearly series of trade with the Duchies by letting change the data by Glazier (1966 p.38) according to movements in total Lombard trade. We estimate trade with other regions of the Austrian empire by adding to reported series a mark-up. On the export side, this latter is equivalent to the share of exports of silk to Vienna on total exports, as independently estimated by Cattaneo (Romani 1982 p.395). We have no independent any information on imports from other territories of the Empire and so we assume arbitrarily they amounted to a third of total trade with foreign countries.

These steps yield series at constant prices and current boundaries for 1850-1858. We extrapolate them backward first to 1828 with the Glazier estimates, which we assume to be at constant prices, and then to 1815 (or 1823) with the "balance of trade". These latter is surely at current prices and thus we deflate exports with the price of silk in Milan (De Maddalena 1974) and imports with average of export price indexes for Austria, the United Kingdom and France [32]. Last but not least, we fill the gap in 1848-1849 by assuming trade was 10% lower than in 1847 (as in Sardinia) and by computing trade in 1849 as the simple average of 1848 and 1850.

iii) Tuscany.

The estimate by Parenti (1959) covers the period 1851-1855 for current and 1851-1859 for constant (1851) prices. We assume that per capita trade in 1850 equalled trade in 1851.

iv) Papal States

Although the Papal States published trade statistics only since 1851, Bonelli (1961) has been able to find unpublished series since 1818, with gaps in 1828-1831 and 1838-1839. Trade for all products but cereals is valued at "conventional" (i.e. constant) 1826 prices, while the data for cereals are at current price. We thus convert these latter into 1826 prices with the series of prices of wheat from Pinchera (1957) and substitute the result in the original Bonelli series. We thus get a series of trade at 1826 prices, which we convert into 1851 prices with an average of British and French prices, with weights 0.66 and 0.34. [33] Finally, we fill the gaps with linear interpolation.

v) Continental South

[31] The difference between 1851 and 1858 is a mere 2% for imports, while export prices were a third higher in 1858 were a third higher than in 1851. See for references and detail of estimation of overseas price series Federico-Tena (2012).

[32] The series for Austria start only since 1831 (Federico-Tena 2012).

[33] According to Bonelli (1961 p.109), the United Kingdom was the main trading partner of the Papal States, followed by France. The difference is quite substantial. In fact import prices in 1826 were 60% and export prices 27% higher than in 1851.

Graziani (1960) obtains his series of trade at "official" (i.e. constant) 1824 prices from two different archival sources, referring respectively to dutiable goods in 1832-1836 and to all trade in 1838-1858. Duties were levied on all imports and on a handful of exports, mostly raw materials (linen, hemp and so on), which accounted for about half total exports in 1838-1840. Thus we augment the original figures for dutiable exports in 1832-1836 by a half and we fill the gap for 1837 with data from Di Salvia (2005 p.158). When necessary, we deduct trade with Sicily, which is to be considered as domestic.[34] Finally, we convert the data from 1824 prices to 1851 prices with a weighted average of price indexes from the United Kingdom (weight 0.45 for imports and 0.43 for exports), France (0.45 and 0.55) and the Netherlands (0.10 and 0.02). These three countries in 1850-1858 accounted for 73% of imports and 43% of exports of the South.[35]

vi) Sicily

As there are no official trade statistics for the island, Battaglia (1983 Tav A and B) resort to archival British sources. These latter provide data in pound sterling at current prices, which Battaglia converts in onze (the local silver-based currency) with a fixed exchange rate. We convert the data back into pound sterling and we deflate them with a weighted average of imports and export prices for France, the United Kingdom, and the United States. Weights, respectively 0.65, 0.25 and 0.10 for imports and 0.50, 0.20 and 0.30 for exports, are an average of share of the three countries on Sicilian trade in 1841 and 1853 from Battaglia (1983 pp.89-90). We then fill the gap for 1826 with a simple average of trade in 1825 and for 1827 and we extend Battaglia's series from 1853 to 1858 assuming that per capita trade increased in Sicily as much as on the mainland.

vii) Duchies

There are no modern estimates of the trade of the Duchies and thus we have to rely on the estimates by Correnti-Maestri (1864 p. 473) for 1858. We extrapolate the figures backward to 1850 by assuming that the commerce of the Duchies had increased as much as the combined trade of Lombardo-Veneto and Sardinia.

All these series are expressed in local currencies (ducati, lire, onze and so on). For the sake of consistency with the other series in our data-base, we convert them in 1913 dollars. First, we convert figures in local currency into 1851 dollars by using the market exchange rates from Giusti (1957) and then we convert 1851 into 1913 dollars. [36] To this aim, we construct price indexes for "Italian" imports and exports, by extrapolating backwards to 1851 the available indexes 1862-1913 (Federico and Vasta 2010). We use a weighted average of export and import prices for Austria-Hungary, Belgium, France, the Netherlands, United Kingdom and the United States, using as weights the shares of these countries on Italian trade in 1862-1867: in total, in these years they accounted for 70.7% of Italian imports and for 66.5% of exports (Federico et al 2011 tab. 4a and 4b).

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[34] We use the earlier data of trade subject to duties from Graziani (1956-1957a, tab.6), which seem more plausible than the later figures by the same author (Graziani 1960, tab. VIII).

[35] The 1824 prices according to this index were 49% higher for imports and 24% for exports than the 1851 ones.

[36] As all Italian currencies were on silver standard, in theory we should have adjusted the prices indexes for countries on gold (Netherlands, the United Kingdom and the United States) by movements of the gold-silver ratio. We have omitted this adjustment because in those years the ratio was quite stable and the gold-standard countries accounted for about a third of the combined trade of the four countries. The coefficient of correlation of the country-based index with the Federico-Vasta (2010) over the 1862-1870 is 0.63 for imports and 0.77 for exports.

Prices come out 18% lower import and 22% for exports in 1913 than in 1851. As a last step, we obtain a series of total "Italian" imports and exports, inclusive of intra-Italian trade, by summing up the polity-specific series.

3.- The series by polity: intra-Italian trade flows

Estimating the share of intra-"Italian" trade is much more difficult than producing a series at current borders. In theory, with seven polities, each importing from and exporting to six "Italian" partners, we should estimate a total of forty-two flows. [37] As said before, trade between Sicily and the South must be classified as domestic, leaving a total of forty flows to estimate. Furthermore, the trade matrix is symmetric: e.g. shipments from Piedmont to Tuscany would be recorded as exports in the Sardinian statistics and as imports in the Tuscan ones. The two figures are bound to differ by the amount of transportation and other transaction costs. In fact, international trade statistics usually exclude these costs from exports (in jargon free on board – or f.o.b.) and include them into imports (cost, insurance and freight or c.i.f.). Transportation costs from one country to another are however nil in the case of overland trade, which involves only the crossing of the border. Thus, given an estimate of these costs, one can obtain a full matrix of trade flows with twenty data only.

Table A.2 sums up the available information for imports flows.

Table A.2

Bilateral trade: available data, import side, 1850-1858

	Sardinia	Lombardy	Duchies	Tuscany	Papal	South	Sicily
Sardinia		**a**	**b**	**c**	**d**	**e**	**f**
Lombardy	*g*		**h**	i	j	*k*	l
Duchies	*m*	*n*		o	p	q	r
Tuscany	*s*	t	u		v	*w*	x
Papal	*y*	z	aa	bb		*cc*	dd
South	**ee**	**ff**	gg	**hh**	**Ii**		
Sicily	*kk*	ll	mm	nn	oo		

Each letter refers to imports into the country named the line row from the country in the column – i.e. a are imports into Sardinia from Lombardo-Veneto, g imports into Lombardo-Veneto from Sardinia and so on. Letters in bold refer to data which can be obtained directly from sources – Graziani (1960) for the mainland South in 1850-1858 and Trade Statistics Sardinia 1858 for the Kingdom of Sardinia in 1853-1858, plus a guesstimate on bilateral trade between the Duchies and Lombardo Veneto (Glazier 1966 p.38).[38] The time or area coverage of these data do not match exactly our needs and thus we have to make some adjustments.

[37] As it is well known, n elements yield n*(n-1)/2 pairs. In our data-base we have seven countries and thus 21 pairs: for each pair of them, we have two flows (exports from A to B and viceversa).

[38] It is possible to compare data on exchanges between mainland South and Sardinia according to Sardinian and Southern Statistics. These latter are consistently higher – by 55% on average 1853-1858 for Southern exports (Sardinian imports) and by 190% for Southern imports (Sardinian exports). It is likely that Southern statistics registered as exports to the Stati Sardi merchandise sent to Genoa en route to Lombardy, Switzerland or

a) we extend the Sardinian series to 1850-1852, by simply assuming that the shares by "polity" in those three-years remained constant at their 1853 level.

b) we divide the total trade of the Duchies and Tuscany, as reported jointly by the Trade Statistics Sardinia (1858) in its components (i.e. b and c). Tuscany accounted for about 62% of the combined population, but it seems likely, for the geographical contiguity, that, per capita trade was higher between the Duchies and Sardinia than between the Duchies and Tuscany. We thus assume that each state accounted for half the combined trade (i.e. that b=c).

c) we divide exchanges between Sardinia and the Kingdom of the Two Sicilies, as reported by Trade Statistics Sardinia (1858) between mainland South and Sicily (i.e. e and f) according to the shares of South and Sicily on their combined total trade.

d) last but not least, we must distinguish Lombardo-Veneto from the rest of the Habsburg empire in both Sardinian and Southern statistics (i.e. in g and k). The province accounted for about a third of the total trade of Cisleithania, the area which was to become the Austrian part of the Dual Monarchy after its 1867 institutional reform (Pichler 2001 tab 19 and 20).[39] This figure can be considered a lower bound of the share of Lombardo-Veneto on trade of "Italian" polities. In fact, trade is likely to have been greater between Lombardy and Sardinia than between Sardinia and –say- Galicia. Furthermore, the Empire included also Transleithania, the future Hungary in the Dual Monarchy, which, in the early 1870s, accounted for about one third of total Imperial GDP (Schulze 2000). We thus assume that Lombardo-Veneto accounted for half the trade with Austria as registered in trade statistics of Sardinia and mainland South.

We thus get eleven bilateral trade flows out of the forty we need. It is possible to estimate eleven additional flows from the available sources by exploiting the symmetry of the trade matrix. Imports into Lombardo-Veneto from Sardinia (cell g in Table 2) are in fact equal to exports from Sardinia to Lombardo-Veneto plus transaction costs. We assume these latter to have amounted to 10% of the value of exports, the average difference between world-wide imports and exports in the 1850s.[40] We estimate the remaining eighteen flows, nine for imports (Roman type in Table 2) and as many for exports with a three-step procedure. We first guesstimate the level of bilateral trade per capita over the period 1850-1858, taking into account the available series, the distance between the polities and any other quantitative evidence our sources supply. For instance, Battaglia (1983,

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Germany, and vice-versa for imports. If this was the case, we should divide the excess trade (the difference between the figures according to the Sardinian and South statistics) between Lombardo-Veneto ("Italian" polity to be deducted anyway to get trade at 1913 borders) and non-Italian polities. Unfortunately, there is absolutely no information to help. Therefore, we have decided to use national statistics in both countries – i.e. Trade Statistics Sardinia (1858) for imports from mainland South and Graziani (1960) for exports from South to Sardinia. If our hypothesis about the source of the gap is correct, these latter figures would overstate intra-"Italian" trade.

[39] The share of Lombardo-Veneto declined from 37.5% of Austrian exports in 1851 to 29% in 1856, and from 29% to 22% for imports.

[40] As said, no adjustment is necessary for trade between countries sharing an overland border. Thus, we do not adjust flows between Sardinia, Lombardo-Veneto and the Duchies and between Tuscany and Duchies, but we adjust the trade between Papal States and Tuscany and the Kingdom of Two Sicilies. In fact given the lack of railway connections and the poor condition of roads, most of the trade was sea-borne, and thus subject to transaction costs (Correnti and Maestri 1864 p. 486, Di Gianfrancesco 1979).

p.90) suggests that all Italian polities, excluding the Lombardo-Veneto, accounted for 11% of Sicilian imports and for 5% of exports. Then, we compute yearly series by letting the decadal average to vary according to total trade of each polity – i.e. we implicitly assume that the distribution by country had remained constant in the 1850s. Finally, we obtain total trade by multiplying our yearly estimates by the total population of each polity (SVIMEZ 1960).

4.- The "Italian" trade before 1850

We obtain an index of total "Italian" exports at constant prices before 1850 as a weighted average of the available country series. We first convert the available series into indexes (1851=1) and then we weight them with the shares of each polity on total exports in 1850-1852. We compute two different indexes, a baseline one, for the period 1823-1858, and an extended one for 1832-1858. The former, includes five polities (Lombardo-Veneto, the Papal States Sardinia and Sicily), which accounted for 74% of "Italian" exports in 1850-1852. The extended index adds continental South after 1832, increasing the total coverage to 85%. The two indexes are highly correlated between themselves (0.99 in 1832-1858 and 0.97 in 1832-1850) and with the actual series, inclusive of the Duchies and Tuscany, in 1850-1858 (0.92 and 0.96 respectively). Thus we are fairly confident that these indexes are representative of Italian exports. We obtain our final series of Italian exports by extrapolating backward the 1850 export level to 1832 with the extended index and then to 1823 with the minimal index. Then we convert the results into millions of 1913 dollars. The result is directly comparable to the other series in the data-base for the same period, although these latter are admittedly more solid than the present estimate.